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resonant with the $|1\rangle \rightarrow |e\rangle$ transitions while scanning the frequency thereof in a range in which transition frequencies of the $|1\rangle \rightarrow |e\rangle$ transitions of the physical systems are distributed, thereby effecting preprocessing for information processing; and

in the case where the $|1\rangle \rightarrow |e\rangle$ transitions of respective physical systems are coupled through a common resonator mode, irradiating the physical systems with light of a frequency resonant with the $|0\rangle \rightarrow |e\rangle$ transitions while scanning the frequency thereof in a range in which transition frequencies of the $|0\rangle \rightarrow |e\rangle$ transitions of the physical systems are distributed, thereby effecting preprocessing for information processing.

14. (Amended) A quantum information processor, comprising:

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physical systems each having three energy levels, two transitions of three transitions between the three levels being optically allowed, wherein a quantum bit of each physical system is expressed by either of quantum states of two levels comprising a remaining optically forbidden transition or by a superposition state thereof, and wherein at least two physical systems are included, one transition of the optically allowed two transitions being different in transition frequency for respective physical systems, with the other transition of the optically allowed two transitions being common in transition frequency for the respective physical systems;

a resonator provided around the physical systems and having a resonator mode that resonates with the transition common in transition frequency for the respective physical systems; and

a light source and an optical system configured to irradiate the physical systems with two kinds of light.
